

CLAIMS:

1. A method for reforming the cornea of an eye to alter visual acuity comprising:

making an incision to a depth of not greater than about 85 microns into the cornea to sever a portion of the epithelial layer, with a portion of the epithelial layer being unsevered to create a hinge;

inserting a separator under the severed portion of the epithelial layer adjacent the hinge region;

sliding the separator under the severed portion of the epithelial layer to thereby separate the epithelial layer from the underlying Bowman's layer and thereby creating a sheet of the epithelial layer attached to the cornea at the hinge region;

altering the underlying Bowman's layer to form an altered underlying cornea bed; and

replacing the sheet onto the underlying cornea bed.

2. The method of claim 1 wherein making the incision includes:

providing a trephine having a cutting surface; and

vibrating the cutting surface.

3. The method of claim 2 wherein the cutting surface of the trephine is vibrated at a frequency between about 20 kHz and about 200 kHz.

4. The method of claim 2 and further including providing a stop on the trephine to control the depth of the incision.

5. The method of claim 1 wherein inserting the separator includes:
providing a separator having a spatula-like portion and having a diameter of not greater than about 0.5 millimeters.

6. The method of claim 5 wherein the spatula-like portion includes a plurality of apertures for ejecting a fluid.

7. The method of claim 6 wherein the apertures have a diameter of less than about 0.01 millimeters.

8. The method of claim 1 wherein inserting the separator further includes ejecting a fluid.

9. The method of claim 8 wherein the fluid is selected from the group comprising air, gel, liquid and gas.

10. The method of claim 1 wherein making the incision includes making an arcuate incision.

11. The method of claim 1 and further including severing the sheet into segments.

11. The method of claim 1 and further including severing the sheet into segments.

12. A surgical instrument for use in corneal reconstruction comprising:
a handle; and
a spatula-like member having a proximal end supported by said handle
and a distal tip opposite said proximal end, said spatula-like member including an
5 arcuate distal section formed in a plane along a curvature and having a triangular
cross-sectional shape.

13. The surgical instrument of claim 12 wherein said spatula-like
member includes a fluid passageway therein that is surrounded by a sidewall, said
fluid passageway being in fluid communication with a fluid source.

14. The surgical instrument of claim 13 wherein said sidewall includes
a plurality of apertures whereby fluid from said fluid source may be ejected onto
the cornea.

15. The surgical instrument of claim 13 wherein said distal tip includes
an aperture whereby fluid from said fluid source may be ejected onto the cornea.

16. The surgical instrument of claim 13 wherein said member is
adapted to be connected to a syringe that contains fluid.

17. The surgical instrument of claim 12 wherein said member has a
height of no greater than about 0.5 millimeters.

18. The surgical instrument of claim 12 wherein said distal section has
a length of about 10 millimeters to about 15 millimeters.

19. The surgical instrument of claim 12 wherein said distal section curvature has a radius of curvature between about 10 millimeters and about 40 millimeters.

20. A surgical instrument for use in corneal reconstruction comprising:
a handle; and
a spatula-like member having a proximal end supported by said handle
and a distal tip opposite said proximal end, said spatula-like member including an
5 arcuate distal section formed in a plane along a curvature and having an oval
cross-sectional shape.

21. The surgical instrument of claim 20 wherein said spatula-like
member includes a fluid passageway therein that is surrounded by a sidewall, said
fluid passageway being in fluid communication with a fluid source.

22. The surgical instrument of claim 21 wherein said sidewall includes
a plurality of apertures whereby fluid from said fluid source may be ejected onto
the cornea.

23. The surgical instrument of claim 21 wherein said distal tip includes
an aperture whereby fluid from said fluid source may be ejected onto the cornea.

24. The surgical instrument of claim 21 wherein said member is
adapted to be connected to a syringe that contains fluid.

25. The surgical instrument of claim 20 wherein said member has a
height of no greater than about 0.5 millimeters.

26. The surgical instrument of claim 20 wherein said distal section has
a length of about 10 millimeters to about 15 millimeters.

27. The surgical instrument of claim 20 wherein said distal section curvature has a radius of curvature between about 10 millimeters and about 40 millimeters.

28. A surgical instrument for use in corneal reconstruction comprising:
a handle; and
a spatula-like member having a proximal end supported by said handle
and a distal tip opposite said proximal end, said spatula-like member including an
5 arcuate distal section formed in a plane along a curvature and having a trapezoidal
cross-sectional shape.

29. The surgical instrument of claim 28 wherein said spatula-like
member includes a fluid passageway therein that is surrounded by a sidewall, said
fluid passageway being in fluid communication with a fluid source.

30. The surgical instrument of claim 29 wherein said sidewall includes
a plurality of apertures whereby fluid from said fluid source may be ejected onto
the cornea.

31. The surgical instrument of claim 29 wherein said distal tip includes
an aperture whereby fluid from said fluid source may be ejected onto the cornea.

32. The surgical instrument of claim 29 wherein said member is
adapted to be connected to a syringe that contains fluid.

33. The surgical instrument of claim 28 wherein said member has a
height of no greater than about 0.5 millimeters.

34. The surgical instrument of claim 28 wherein said distal section has
a length of about 10 millimeters to about 15 millimeters.

35. The surgical instrument of claim 28 wherein said distal section curvature has a radius of curvature between about 10 millimeters and about 40 millimeters.

36. A surgical instrument for use in corneal reconstruction comprising:
a cutting member; and
means for vibrating said cutting member.

37. The surgical instrument of claim 36 wherein said cutting member includes a circular cutting blade for forming an arcuate cut extending over an arc from about 250 degrees to about 330 degrees.

38. The surgical instrument of claim 26 and further including a stop member for controlling a depth of cut.